

## **X-rays from Around a Black Hole**

### **Clip from *Building the Coolest X-ray Satellite***

Video

ANIMATION OF FLYING INTO A BLACK HOLE

Audio

KIM WEAVER: Black holes have extreme gravity and they have a lot of intensity and heat and energy around them, and so the regions around a black hole are going to be producing x-rays as opposed to optical light, so if you are going to probe a black hole – you need to be able to see x-rays.

Video

CENTAURUS A VISUALIZATION WITH BLACK HOLE ANIMATION AT THE END

GRAPHIC: CENTAURUS A OPTICAL LIGHT

GRAPHIC: CENTAURUS A X-RAY LIGHT

GRAPHIC: ARTIST'S CONCEPT OF BLACK HOLE

Audio

KIM WEAVER: A galaxy is filled with all sorts of stars and gas and dust. And that gas and dust blocks our view to the center of the galaxy. So if we look at it in optical light, we can't see the center of the galaxy, because there's all the dust in the way. But in an Active Galactic Nucleus that has a huge black hole in the center that gives off x-rays around it, around it in an accretion disk, you can use those x-rays to probe into the center of the galaxy. So, you can see the through the gas and dust.

Video

ANIMATION THE REGION AROUND A BLACK HOLE WITH ACCRETION DISK AND JETS

Audio

KIM WEAVER: If you could see a black hole it would cast a shadow to you eye. So, you would see the disk and you would see a little black spot in the middle, that would be the shadow of the black hole, but what you are really seeing in x-ray light is the disk itself.

Video

KIM OC

ANIMATION OF MATERIAL SWIRLING INTO BLACK HOLE AND JETS

Audio

KIM WEAVER: The black hole has a huge amount of gravity, so it brings material toward it. And what happens is it accretes material. Material comes in and falls into the black hole. And that's why you can see the black hole, because as material comes into the black hole it also emits light and gives off energy. So the black hole produces it's own, sort of it's own signature, if you will, by the fact that it is eating stuff and as it eats stuff it heats stuff up and the stuff that's left outside the black hole swirls around it and that's how you detect the black hole. You detect the stuff from this accretion disk, and you also see jets. The black

hole can not only eat material, but it can cause material to be pulled in a spiral upward and be shot away from it, into jets on opposing sides.